Title

Farm-to-Bar and Bean-to-Bar Chocolate on Kaua'i and the Big Island, Hawai'i An Industry Profile and Quality Considerations

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Farm-to-bar and bean-to-bar chocolate on Kauaʻi and the Big Island, Hawaiʻi: an industry profile and quality considerations

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Abstract

Farm-to-bar and bean-to-bar chocolate in Hawaiʻi is a growing economic sector. This chapter investigates this phenomenon through social science fieldwork and a panel tasting, with a focus on Kauaʻi and the Big Island. There are many promising developments for cacao growing and chocolate making on these islands, but a substantial minority of chocolate makers face quality problems. By craft chocolate standards, Hawaiian chocolate makers range from very high to very low quality. Cacao/chocolate agritourism provides an important venue for both revenue generation and quality feedback loops. Unlike in most cacao-producing regions, governance of cacao and chocolate quality in Hawaiʻi is largely a bottom-up endeavor, and thereby offers interesting possibilities in the governance of quality, which the conclusion explores.

Keywords: cacao, chocolate, Hawaiʻi, Kauaʻi, Big Island, agritourism, quality, farm-to-bar chocolate, bean-to-bar chocolate

Introduction: Cacao and Chocolate in Hawaiʻi

Chocolate in Hawaiʻi is a growing economic sector. While companies like Hawaiian Host have long made chocolate-covered macadamia nuts (from imported cacao and chocolate), cacao is a relatively new crop being grown commercially in the state, with current efforts dating only from the 1990s.

Previous attempts at growing cacao in Hawaiʻi commercially, but none lasted long. Crawford (1937: 73) notes that Dr. Hillebrand first introduced cacao to the islands around 1850, with some interest developing in the late 1800s. The Hawaii Experiment Station planted about three acres of cacao in Hilo in 1905, and in 1917 the state legislature asked the Hawaii Experiment Station for an evaluation of cacao as a commercial crop (Crawford 1937: 74). In a prescient passage that predicts important developments today, the report noted the uniqueness of the Hawaiian situation in relation to the rest of the world, noting that cacao is grown "on comparatively cheap lands at considerable distances from the world's markets and with the cheap labor so prevalent in most tropical countries. Hawaii, therefore, would have to meet strong competition in marketing the raw product. By reason of its nearness to markets and its good transportation facilities, Hawaii could counterbalance this disadvantage by entering the field of manufacture-a thing not yet attempted generally by countries far from the consumer" (Hawaii Experiment Station Annual Report 1917: 22, cited in Crawford 1937: 74-75).

A second introduction occurred in the 1980s (Schnell et al. 2005), but the operation fell apart, and in early 1990s, the Hodge Farm planted cacao on one acre in Keauhou, south of Kona on the Big Island. This was bought by Bob and Pam Cooper in 1997, who added a chocolate-making facility and started the Original Hawaiian Chocolate Company, the first chocolate made in Hawai‘i from Hawaiian cacao and still a successful operation (Bob Cooper, pers. comm., 1 September 2017). Dole also started an estate on Oahu using some germplasm from the failed 1980s operation, and produced what Gary Guittard, president of Guittard Chocolate, said was "some of the best in the world" (Cheng and Katrina 2015), an indication of quality based on the speciality cacao market in which cacao is "perceived to have a rare or prized flavor profile" (Leissle 2018: 161).

Hawaiian chocolate — cacao growing linked to chocolate making — is therefore a new industry. In 2010, H.C. "Skip" Bittenbender, a cacao and tropical fruit tree specialist at the University of Hawai‘i College of Tropical Agriculture & Human Resources, estimated that there were fewer than 30 growers with under 100 acres of the tree planted (Gomes 2010). Fleming et al. (2009: 9) noted that, "The Hawai‘i cacao industry is young. All growers are relatively small-scale, and currently none are making a living solely by growing cacao."

Beyond these indications, detailed statistics on the industry do not exist, but it appears to be growing and gathering momentum. The growth today in local Hawaiian chocolate is evident in three forms:

1. Chocolate agritourism is booming judging from new tours being added by farms and older tours adding more days of the week to their tour schedule. Tourists, mostly from temperate regions where cacao does not grow, come to Hawai‘i to experience the tropics and are increasingly interested in where food comes from.
2. The number of people making chocolate in Hawai‘i is growing rapidly, with many new makers getting into the business, and more variety available in local grocery stores. Outside of the islands, producers and consumers in the craft chocolate world know Hawai‘i-grown chocolate because of two well-known craft chocolate makers, Mānoa and Madre, both on the most populous, and most visited, island of Oahu. Neither use exclusively Hawai‘i-grown cacao due to its scarcity, but both regularly feature excellent bars made from high-quality, specialty cacao beans from the Big Island.[1] Both have won numerous national and international awards, putting Hawai‘i-made and -grown chocolate on the world map of fine chocolate. In addition to these two well-known makers, there are more than 20 other makers, most of a much smaller scale.
3. More land is being dedicated to growing cacao, even though it is still very small (Gomes 2010). Many of the new makers are also cacao growers, making single-estate chocolate, a relative rarity in the world where, since colonial times, there has been a vast geographical disconnect between cacao growing and chocolate making (Coe and Coe 2013). But there are many other cacao growers who have recently started in Hawai‘i, from commercially-oriented estates to householders growing cacao in their backyards. Cacao landscapes, however, are mostly not readily visible, since cacao trees are an understory species (they evolved under the canopy of the western Amazon rainforest) and like to be protected from wind, unlike grapes in the landscapes of wine-growing regions (Stanislawski 1970).

I explore these transformations in this chapter by focusing on farm-to-bar and bean-to-bar[2] chocolate makers on Kaua‘i and the Big Island. In reporting on my findings, I engage in a rather unorthodox mixing of my data and findings from traditional forms of knowledge production in social science with that of personal and panel tasting experience. These chocolate makers are much

smaller in scale than Mānoa and Madre, with many starting recently and others just getting going. In this chapter I argue that promising developments for cacao growing and chocolate making abound, but that a substantial minority of chocolate makers face quality problems. By craft chocolate standards, the products of Hawaiian chocolate makers range from very high to very low quality. The conclusion explores questions around quality and standards and issues involved in applying them.

A cacao/chocolate primer: the fermented landscapes of specialty cacao and craft chocolate

While most people know that alcohol production requires fermentation, few know that chocolate is a food much improved by fermentation. The flavor of "finished chocolate comes from a multitude of sources: the genetics of the trees; terroir, including the land and soil conditions as well as climate during pod maturation (5 1/2 months long); fermentation and drying; the local microbiome where the fermentation is being carried out; and the factory processes such as roasting, conching, etc." (Seguine and Meinhardt 2014: 25). While fermentation is not required to turn cacao beans into chocolate, it is "a crucial step for flavor development," and the industry consensus is that fermented beans are required for high-quality chocolate (Leissle 2018: 6). Indeed, chocolate industry professionals argue that fermentation is a much more complex and important process for fine chocolate than it is for fine wine (Smillie 2016). To understand why, some background information is important.

Chocolate is made of finely ground, dried cacao "beans," which are the seeds within the cacao tree's fruit, the cacao pods (Figure 1). Cacao trees typically yield cacao pods between three to five years of age. Each cacao pods contains 30 to 50 of cacao beans, in a matrix of white, sweet, mucilaginous pulp, which provides sugar as the fuel for fermentation (Figure 2).

Fermentation for cacao starts when the pods are broken open and the contents are combined into a pile or box. Fermentation style and quality varies a great deal between types of markets. The largest distinction in cacao markets is between "bulk" cacao and "specialty" cacao (also known as fine flavor cacao). Bulk cacao forms the backbone of the chocolate industry, and is mostly grown in West Africa (Leissle 2018). It is priced through the cocoa commodity price set by the New York and London stock exchanges. No one knows exactly what proportion of bulk cacao is fermented because it often matters little to the final product. When it is fermented, bulk cacao's fermentation process is not usually tended attentively as specialty cacao because there is almost no incentive for high quality (O'Dougherty 2017), except in Ghana, known for is high-quality bulk cacao. Thus, some bulk cacao is unfermented or "washed," with the pods broken open and the pulp washed off the beans soon after harvest and therefore not subjected to fermentation in heaps or boxes (Leissle 2018). Specialty cacao, on the other hand, has with various flavor qualities that separate it from bulk cacao. The International Cocoa Organization (ICCO) considers the following tasting notes to differentiate beans into the "flavor" category: "fruit (fresh and browned, mature fruits), floral, herbal, and wood notes, nut and caramelic notes as well as rich and balanced chocolate bases" (International Cocoa Organization 2016). Fermentation, genetics, and terroir all make flavor contributions to specialty cacao (Sukha et al. 2014). Chocolate makers are willing to pay up five times the bulk cacao price, from about $3,000 to $10,000 per ton (Nieburg 2016).

Without considerable manipulation, unfermented (washed) cacao beans make disgusting, unpalatable chocolate. This is not an observation made in the scientific literature on chocolate flavor, as that literature has been focused on producing palatable chocolate flavors out of bulk beans of various quality (fermented and unfermented). Instead, I heard this from many craft chocolate makers during

interviews (see Galt et al. in preparation), and had to take their word on this quality distinction until I experienced it myself. At a workshop demonstrating the importance of fermentation during the 2016 Northwest Chocolate Festival, chocolate makers Dandelion and Raaka made chocolate from unfermented beans, emphasizing that this was for education purposes only, and that they would never make chocolate that tasted like this, nor let their customers eat it. To me, it tasted like a strong mix of vomit and tar, with hints of gasoline. It was so unappealing that it worked as an appetite suppressant for me, mimicking the experience of having recently vomited, and thus making me uninterested in eating for about two hours. Many craft chocolate makers explain that the large industrial chocolate makers have spent considerable time, money, and effort using food science to take largely unpalatable raw materials — unfermented and poorly fermented bulk cacao — and highly process it (e.g., roast it at high temperatures to destroy off flavors, add a great deal of extra ingredients like sweeteners, milk powders, and emulsifiers) to create the standard chocolatey flavor common in mass-produced chocolate like Hershey's. In talking about this process, Colin Gasko, a well-respected craft chocolate maker of Rogue Chocolatier, noted, "I don't know how they're able to make a palatable product out of such awful raw material. It's some impressive chemistry" (Jacobsen 2010: 260).

In contrast, craft chocolate makers concentrate on sourcing specialty cacao, which is always fermented. Thus, cacao farms that grow specialty cacao are a part of fermented landscapes (see Chapter 1). Farmers connected to these markets must pay attention to quality, as "[s]everal characteristics of chocolate strongly depend on the processes done at the very beginning of the supply chain" (Saltini, Akkerman, and Frosch 2013: 168). Cacao fermentation is arguably the most crucial process, as it creates flavor precursors for the flavors they seek and reduces bitterness (Afoakwa et al. 2008). Cacao fermentation generally requires relatively large volumes — at least half a cubic meter/yard — to reliably reach high enough temperatures to chemically transform the beans (O'Dougherty 2017). It is done in piles, in pits, and, perhaps most commonly in the specialty cacao world, in wooden fermentation boxes (Figure 3). These are typically about 1 m by 1 m and made of wood slats to allow for some breathing. In well-tended ferments, the beans are turned about every day to enhance aeration (thereby allowing the oxygen-loving microorganisms to remain dominant), and left to ferment from three to seven days, depending on the cacao variety, until the transformation is deemed complete. Fermenting for too long, or for not enough time, "is also noticeable — and not deliciously so — in the chocolate's flavor" (Leissle 2018: 171). Cacao bean fermentation is an art that, when done successfully, transforms the bitter raw cacao bean into a flavorful bean ready to be made into chocolate, or roasted and sold as snacking cacao or nibs, which are roasted beans that have been cracked and winnowed.

Once fermented or washed, cocoa beans are then dried. Drying processes vary greatly, from being spread on the side of the road to wooden drying racks (Figure 4). It is in this form — dried beans — that cacao is usually sold from growing regions to making regions, providing the raw material for chocolate makers.

Cacao beans are heavily transformed in the chocolate-making process. Through careful processing — including sorting, roasting, cracking, winnowing, grinding/refining/melanging (and sometimes conching), and tempering — the flavor notes produced and enhanced through fermentation can be further showcased. Refining, also called grinding and melanging, is the process of reducing the particle sizes of cacao solids and sugar to particles small enough to be felt as smooth by the human tongue. Conching, "probably the least understood process in modern chocolate making," is the process of heating and mixing all of the chocolate ingredients once combined, with the goal of

mellowing the sharp taste of fresh cacao and reducing acidity and bitterness (Nanci n.d.). In experienced hands, these processes allow the eater to distinguish a variety of flavor notes in one savored bite.

While most of the chocolate-consuming population has yet to explore many of the flavor nuances of craft chocolate, that time is coming. As with the rise of "craft" production and consumption for wine, beer, coffee, and cheese in recent decades, craft chocolate is having a moment. Craft chocolate bars ranging in price, typically from $4 to $12, are increasingly appearing on supermarket shelves in the United States. While there were only a handful of craft, bean-to-bar chocolate makers in the USA in 2006, there are now upwards of 300 (Hoehn-Weiss 2018). In the last decade, these makers have focused on highlighting the various flavor qualities of cacao beans from different countries and regions (Williams and Eber 2012, Leissle 2013a, b, Giller 2017). This makes it possible to appreciate the strong citrusy and/or raspberry notes of a Madagascar bar, or the fruit-forward berry jam character of a Dominican Republic bar, giving rise to the idea of terroir, or taste of place (Trubek 2008), within chocolate (Nesto 2010). And this is just the beginning of the distinctions one can taste.

These developments made me curious about the connections between craft chocolate and cacao growing in Hawai'i, the only US state where it can be grown due to the crop's tropical climate requirements. Since European colonial times, cacao-growing landscapes have been very far removed from the chocolate making process, since almost all chocolate making is done within the Global North (Leissle 2018).[3] Thus, the typical connections between growing and consuming are much more elongated than other commodities, especially alcohols, considered in this volume. Yet, as Leissle (2018: 44) notes, "Hawaii — the only place [state] in the US where cocoa grows — is making an innovative contribution, as small-scale manufacturers condense the commodity chain by making chocolate from local beans." This makes it an exciting location in which to study chocolate.

Craft chocolate quality norms

The original goals of my research in Hawai'i included a broad understanding of the possibilities and challenges facing the farm-to-bar and bean-to-bar movement within the relatively remote contexts of Kaua'i and the Big Island. Before starting, I considered the tasting experience to be a pleasant addition to the research, rather than a central issue to be explored. This changed after a few days of fieldwork, since the range in quality of the chocolate I ate was extreme from the beginning, and this large range — from excellent to very bad — continued throughout my experience. Since the ideas of "excellent" and "bad" are highly subjective, below I lay out a framework for how chocolate quality has been defined in the recent craft chocolate movement. This is the framework for understanding my comments on quality in this chapter.

Chocolate quality is notoriously difficult to define. The craft chocolate industry has yet to agree upon industry-wide quality standards at any level, both for raw materials — wet beans and fermented beans — and for finished chocolate bars — temper, off-flavors, etc.[4] in large part because it celebrates and accentuates the radically different flavors that are produced by cacao, one of the world's most complex foods. Craft chocolate has defined itself largely in opposition to mass-produced chocolate, where consistence in flavor profile across time has been a goal. However, in the place of formalized norms are norms of the informal, unwritten sort. After having relentlessly tasted craft chocolate for the last four years, and tasted quite a bit of chocolate in Hawai'i that violated these norms, these are the unwritten norms of the craft chocolate movement as I have experienced them.

The flavor norms for US craft chocolate are strongly in line with the ICCO definition of specialty cacao noted above. This includes:

- a strong preference for flavors that work well with sweetness according to the US palate, especially fruity, nutty, and "chocolatey," which is a craft industry term to describe the "standard" chocolate flavor that US consumers are used to, and that is produced in its highest-quality form in Ghana (Leissle 2018);
- a mixed take on flavors not historically associated with chocolate in the US palate, e.g., woody, earthy, floral, leather, and mushroomy, as these can be found as the main flavor notes in some bars, but they are relatively rare;[5]
- aversion to the dominance of flavors that almost all would agree are stomach-churning "off" flavors for chocolate, e.g., vomit, gasoline, tar, vinegar, etc., which are considered to be errors in the making process, rather than something that might be tolerated as in wine (see, for example, the Good Food Awards Chocolate Tasting Rubric in Table 1); and
- for the best bars, complex and varied flavor notes which come in and out of the tasting experience over time, as sections of an orchestra playing a symphony. This "symphony" quality of the best bars is highlighted by connoisseurs and leading chocolate makers and experts in the industry like Ed Seguine, Georg Bernadini, Art Pollard, and many others (Bernardini 2015; Ed Seguine pers. comm. 31 May 2016), and is used in chocolate tasting competitions such as the Good Food Awards (Table 1).

Other craft chocolate norms include:

- a strong temper with a good snap and a surface sheen (the goal, technically speaking, is fat crystal form V), with fat blooming and cocoa butter rancidity considered as flaws,
- high-quality packaging with an in-depth product description often going into flavor profile, the place of origin for the beans, the grower/cooperatives involved, etc., and
- experimentation and innovation, with the goal of making chocolate differently from mass-produced chocolate, which includes highlighting terroir, or a taste of place (Jacobsen 2010, Nesto 2010, Leissle 2018), and, thus far, a willingness to share and collaborate as small chocolate makers.[6]

This is the quality framework that I applied to my tasting experiences with farm-to-bar and bean-to-bar chocolate in Hawai'i, and that most of the tasting panelists, detailed below, are familiar with and therefore used.

While the quality norms of US craft chocolate seem like an external imposition, I think it is an appropriate standard for a few reasons. First, Hawai'i is part of the US, and the US is ground zero for the craft chocolate movement, with innovation and quality now surpassing Europe according to Bernardini (2015). Second, by selling at $6 to $15 per bar, farm-to-bar and bean-to-bar chocolate in Hawai'i is on the high-end of the price points of mainland craft chocolate, which is between $4 and $12 (with rare extremes going to $18). This makes it squarely within the sales niche of craft chocolate rather than mass-marketed chocolate bars like Hershey's. Third, Hawaiian cacao beans are typically considered specialty beans, and have won multiple international flavor awards recently. Two of the top 18 winners of the 2017 Cocoa of Excellence programme's International Cocoa Awards — a widely recognized industry award given at the premier international chocolate venue,

the Salon du Chocolat in Paris — were from the state (from the University of Hawaii, Mānoa and the Nine Fine Mynahs Estates on Oahu), and another of the top 50 was from Steelgrass Farm on Kauaʻi (Ernst 2017). Hawaiʻi cacao expert H.C. "Skip" Bittenbender notes "Hawaiʻi grown cacao produces a high quality chocolate with a superior flavor profile" (Ernst 2017).

Methods

In August and September 2017, I conducted a month of fieldwork on Kauaʻi and the Big Island. I chose two groups of chocolate makers on the two islands: (1) farm-to-bar makers (makers who grow their own cacao and make it into chocolate), and (2) bean-to-bar makers who make chocolate using only cacao grown in Hawaiʻi. Based on internet searches, snowball sampling, and local guides, I was able to find six of these makers on Kauaʻi and 17 on the Big Island. I conducted interviews with a majority of the members of these two populations, three on Kauaʻi and 14 on the Big Island. The interviews focused on their business model, their views of the craft chocolate movement, cacao sourcing, certifications, competition, sales, consumers, finances, labor, and challenges. Interviews typically lasted around an hour. I also visited many cacao farms and chocolate factories, workshops, and kitchens to make observations.

I also gathered chocolate to eat, and then engaged in personal tastings, an experience that informs my findings. The individual subjective aspect of this tasting is undeniable, as I have my own taste preferences which have been largely shaped by enjoying mass-produced chocolate as a child and into adulthood, and then by relentlessly tasting craft chocolate — easily eating over 100 bars per year — over the last four years. Thus, in addition to recording my tasting impressions — based on quality as defined in the craft chocolate movement — I brought many bars home to set up a panel tasting with nine of my graduate students. These students tasted 17 bars of farm-to-bar and bean-to-bar chocolate from Kauaʻi and the Big Island. Most of them have eaten considerable amounts of craft chocolate since I bring craft chocolate bars from the United States and beyond to share in our weekly lab group meetings. Thus, the general tasting palate of myself and my students has been informed by the standards of craft chocolate movement but in an informal way, except for one student who has been active in helping to create sensory standards for chocolate tasting. The panel used the tasting protocol from the Good Food Awards' Chocolate Judging Rubric (Table 1), except that the packaging was available for them to see. Each panelist recorded their sensory impressions of each bar — quantitative and qualitative — within their own tab in a Google spreadsheet set up for the tasting.

Table 2 shows the number of interview, visits, and tastings that inform this chapter. I analyzed the interviews and observations according to patterns observed. The panel tasting data were compiled and analyzed according to the composite scoring done in the Good Food Awards. I present my findings in two sections below: 1) context, value-chain models, and agritourism; and 2) quality considerations.

Context, value-chain models, and agritourism

A chocolate world of its own

Hawaiʻi is the most remote island chain in the world, yet is also part of the United States. Given the colonial history and present of Hawaiʻi as a kingdom and now as as US state, it is important to note the identities of those involved in cacao and chocolate. Only one of my 17 farm-to-bar and bean-to-bar interviewees identified as having Native Hawaiian ancestry. The vast majority were of European descent (commonly called "haoles," which also refers to foreigners and foreign things generally), yet it is common among white farmers to use Hawaiian words, including kokoleka, in their business or

product names. That cacao is a recent introduction and not a canoe plant — crops brought by the first Polynesian settlers of the islands — makes it unsurprising that it does not have a large role within the renaissance of Native Hawaiian agriculture. Whether Native Hawaiian farmers embrace it as a crop in the future will be interesting to see.

Hawai'i is the only tropical state in the nation (the U.S. holds a number of tropical territories, but no others are states), and it has an economy largely dependent on tourist spending. These characteristics mean that its chocolate production is a world unto itself in many respects, especially in labor availability and land prices.

Unique aspects emerged when I asked makers about the major challenges they face. Farm-to-bar makers commonly brought up the high cost of farm labor, and a general shortage of qualified workers (see also Fleming, Smith, and Bittenbender 2009: 4). Generally, the small scale of production for smaller grower-makers is such that they and their households provide most of the growing labor, including planting, pruning, fertilizing, and harvesting. The harvesting and post-harvest processing — cracking the pods, scooping out the seeds, and getting them into fermentation containers — tends to require the most labor in a time-sensitive window, as allowing the pods to sit too long after harvest can negatively impact flavor. Workgroups are a common solution to this. Having given up on finding regular employees, one grower-maker creates occasional workgroups of family and friends, guaranteeing that all will be paid $20 per hour. Another maker relies on work parties that are formed around learning about cacao and chocolate making.

An additional challenge is that all agriculture in Hawai'i faces high land prices, as tourism and the desire to live in a tropical climate in the United States have driven real estate prices higher. High labor and land prices mean that producing cacao in Hawai'i is very expensive relative to the rest of the world. One economic analysis shows that costs of production per acre are $7,927 (Fleming, Smith, and Bittenbender 2009: 11) equivalent to $4,560 per ton of dried/fermented beans, although some growers have estimated them as being nearer to $10,000 per ton (Klassen 2016). These costs are about two to five times above the bulk chocolate commodity price, which tends to be around $2,000 to $3,000 per ton.

Thus, the Hawaiian context creates certain economic conditions that shape chocolate production. For bean-to-bar makers, cacao as a raw material comes at a much higher cost than bulk cacao world market prices, which means that they must also sell their chocolate at craft chocolate prices. For this reason, Hawai'i-grown-and-made chocolate sells for $6 to $15 per 2-ounce bar, which is on the high end of mainland craft chocolate. Farm-to-bar makers, who attempt to make a living as farmers in Hawai'i, need to use their farms in a way that generates considerable income. The two major strategies of farm-to-bar makers are to (1) engage in value-added production through chocolate making, and (2) create agritourism opportunities or find another way to tie into the tourist economy. While these attributes are similar across makers, I found a wide variety of models in the way that Hawai'i-grown cacao beans get into consumers' mouths as chocolate. I explore these below.

From cacao to chocolate: diverse value-chain models of production, sourcing, making, and exchange

An important finding of this research is the diversity of forms that the value chain of farm-to-bar and bean-to-bar chocolate takes in Hawai'i. This diversity manifests across all sections of the cacao-chocolate value chain: cacao growing, cacao sourcing, chocolate making, and chocolate sales/exchange.

Cacao orchards on the two islands run almost the full range of the shade continuum identified by Rice and Greenberg (2000). There are very diverse polycultures with the interplanting of cacao with a variety of other fruiting trees and shade trees (Figure 5), monocultures of cacao planted under sparse shade (Figure 6), and full-sun monocultures (Figure 7). Growers have very different opinions about the use of shade. Those growing full-sun monocultures highlighted that they were at the northern limit of the cacao production zone, so the trees need less shade than in regions closer to the equator. Those engaging in shaded polycultures highlighted an organic and agroecological approach to farming, emphasizing local nutrient cycling rather than synthetic fertilizers, and the origins of the cacao tree as an understory plant. Land tenure was similarly diverse, and ranged from those owning their land (for various time periods, including multi-generational and as part of the back-to-the-land movement in the 1970s), to temporarily growing on land that might be developed for condos, to convincing another farmer to plant some cacao groves in their already diversified fruit forest.

Sourcing of cacao is highly varied as well. The single-estate model of sourcing involves makers who use only cacao beans produced on their farms. A number of farm-to-bar makers rely on this model, and are able to control quality from farm to bar. For makers who have a good handle on producing quality cacao and chocolate, this approach yields exceptional bars. However, for those less practiced or with less care in the processes involved, especially fermentation, the single-estate bars highlight their limitations as noted below.

Another sourcing model is a distributed farming model, whereby farm-to-bar makers have a known going rate for purchasing pods from growers (ranging from $1 to $2), and encourage householders and small-scale farmers to plant cacao to feed into their chocolate-making enterprise. The quality achieved through this model varies greatly, as with the single-estate model. Farm-to-bar makers who know a great deal about growing cacao and fermentation provide technical assistance to the backyard growers who sell them pods, and ferment in a central location to achieve volume. One maker in particular produces exceptional bars from specific groves with unique genetic traits (referred to on the islands as *Criollo* but without genetic testing to back up the claim). These are not available through retail channels because they are extremely rare and cost $20 to $50, and therefore are only available by word-of-mouth connections. On the other hand, makers with less attention to quality can produce off-flavored chocolate from such a distributed model. This might result from not providing assistance to growers, and/or about a lack of concern for ripeness and/or the time between harvest and fermentation (waiting too long can reduce cacao quality); however, issues of fermentation quality abound as well, as noted below.

Chocolate-making factories and kitchens are similarly diverse: some are medium-scale operations (Figure 8), but most are small. With rapid advances in small-scale chocolate-making equipment and knowledge, and with the knowledge shared by John Nanci on his Chocolate Alchemy website, setting up a maker-ready chocolate factory with making equipment can be done with as little as $1,000 to $2,000. Most bean-to-bar and farm-to-bar makers followed this model and established a small chocolate-making facility in their home kitchens. A less common practice, done by two single-estate makers, is to grow the beans and then contract the chocolate making out to world-class chocolate makers on Oahu, shipping their beans there and receiving finished, wrapped bars in return. This produces exceptionally good chocolate.

Chocolate makers in Hawai‘i face an important tropical challenge: a lack of climate control makes tempering difficult. Tempering chocolate is an essential part of the making process. Cocoa fat

crystals can take six specific forms, and the goal of chocolate making is to achieve Form V (also known as beta crystals), which gives the surface a sheen and provides enough rigidity for the chocolate bar to "snap" when broken into pieces (Notman 2015). Given the year-round warm temperatures on the islands moderated by the trade winds, residences rarely have air conditioning. Cooler temperatures, created easily by air conditioning, makes the tempering process much easier in a tropical climate. Lacking air conditioning, many chocolate makers reported waking up in the middle of the night and very early morning to temper in their kitchens during this coolest period of the day. This yielded highly variable results, from good tempers to poor tempers with a crumbly texture, which shows that a consistent fat crystal Form V was not achieved.

Another way to facilitate tempering is through creating climate-controlled shared kitchen space. While shared commercial kitchens have been growing as the craft food movement expands (including in Hilo, Hawai'i), chocolate makers tend to avoid these spaces. The chocolate-making process requires very long time periods for some processes (e.g., running a melanger for 24 to 72 hours) and chocolate is extremely vulnerable to taking on the odors of other foods (e.g., someone cooking garlic in the shared space as the melangers run). One interviewee on the Big Island was establishing a commercial kitchen with climate control to be shared specifically by chocolate makers for a simple production fee. Such a space could be a large boon to makers lacking their own space to temper their chocolate well.

Makers use a variety of retail venues to sell their chocolate. Getting into retail outlets — the islands' few grocery stores, especially the natural food stores and gourmet stores — is a common strategy, and seems to serve both the makers and the grocery stores well. Grocery stores tended to have locally-made sections of a variety of tropical items (Figure 9). Indeed, in almost all grocery stores, one can find some Hawai'i-made farm-to-bar or bean-to-bar chocolate, although these invariably receives less shelf space than the imported chocolate from mainland companies (Figure 10). In other stores, Hawaiian chocolate means the mass-produced chocolate-covered macadamia nuts from Hawaiian Host or other such confection using imported couverture or imported cacao beans.

Direct-to-consumer sales are a common market outlet because of agritourism. Makers running farm tours always end the tours in their gift shops, farm stands, or gift lanais. One maker who offers farm tours also runs a road-side farm stand — with chocolate and various chocolate-related gifts like hats and shirts — on the main road on Kaua'i, thereby receiving tourists looking for chocolate. Additionally, some makers sell in farmer's markets. Another maker sells through his coffee shops on the Big Island (Figure 11).

Chocolate also is exchanged in a less-commoditized form. One farm-to-bar maker uses his chocolate as a special treat for guests who come to his retreat center and as a part of the chocolate dance/cacao harvest parties thrown each Friday night. Another who runs an upscale Airbnb is considering giving it as a gift for her guests. A larger farm-to-bar maker gives chocolate away during his $50 chocolate-making class which starts with a harvest and goes all the way through the making process. All of these exchange relationships — both commodity exchange and less-commoditized exchange —reflect the strong connection between chocolate and tourism in Hawai'i.

Chocolate agritourism

The state's economy depends in large part upon tourism, with millions of visitors arriving each year. Chocolate in Hawai'i is strongly connected to tourism; while high land and labor values flow in part from tourism, it also brings in consumers for cacao farm tours and chocolate. Indeed, when asked

about the level of demand for their chocolate, many makers said that they were always able to sell everything that they make. The novelty of a U.S.-grown-and-made chocolate bar proves irresistible to many mainland U.S. consumers.

In addition to tourists as eager chocolate consumers, cacao farm and chocolate tours offer a new experience to many tourists coming from the mainland US or from other temperate climates. Steelgrass Farm and Garden Island Chocolate on Kaua'i and The Original Hawaiian Chocolate Factory and Kuaiwi Farm on the Big Island all offer tours of various lengths, easily found online via major tourism websites like Trip Advisor and Yelp. Additionally, other grower-makers were beginning to create their own tours, seeing both the economic opportunity of garnering tourist dollars, and expanding their customer base to longer-term consumers who mail-order purchase from the farm once they return home.

I attended three cacao farm tours aimed at tourists. Two were similar, three-hour long tours for $75.[7] They began with a leisurely stroll through highly biodiverse cacao farms, highlighting both cacao and various tropical crops, especially fruit trees and vanilla. They both involved a wide-ranging tasting of tropical fruits and nuts and ended with a chocolate tasting of a variety of products. The other tour was shorter, one hour, and focused on the cacao trees, the drying racks, the fermentation bins, and the chocolate factory itself. Tastings were included as part of the tour, although the formats varied. Two of the the tours sampled only their chocolate, while the other provided samples of their chocolate, along with many other samples in order to contextualize their chocolate in the realm of craft chocolate.

These tours are a valuable educational opportunity for chocolate eaters since, as a commodity, chocolate has been subjected to an extreme form of commodity fetishism (Martin and Sampeck 2015). First, while some food commodities come from production processes nearby (e.g., an orange in California), cacao grows commercially only in the tropics while the vast majority of consumption occurs in the temperate regions. This means that most consumers have not seen a cacao tree, let alone do they know what cacao is and how how that raw input relates to the final chocolate product. Second, until recently, almost all cacao has been highly processed before being added to a food, and has also been part of products composed largely of other ingredients (e.g., a Hershey's bar is only 11% cacao content, being composed mostly of sugars and milk powder (Sethi 2015)). This means that the material in its unprocessed form created by the tree — the cacao "bean" (a seed, botanically) — has also not been witnessed by most of its consumers.

On the tours, tourists were extremely eager to learn more about tropical crops, especially cacao, since the plant was so foreign to most of them. Starting from almost no knowledge base, the experiences led to rapid learning on their part, helping dispel some of chocolate's commodity fetishism by showing the biological origins of cacao. Additionally, on two of the three tours I attended, some parts of the labor process were discussed, with growers highlighting some of the challenges. Yet this occurred in a sanitized form, with labor exploitation, if acknowledged, presented as something happening in other cacao growing regions.

Overall, all of the chocolate tours offer a major leap forward for consumers' understandings of cacao as a tropical fruiting tree, and in the different flavors possible in chocolate. Whether this creates a positive image of all chocolate, or just Hawaiian chocolate, would be an interesting question to investigate with further research. At the same time, chocolate agritourism greatly benefits those operations that rely on it as an income stream. One of the farm-to-bar makers

operating tours stressed the importance of agritourism: "tourism holds an important key to making farming profitable, again, in Hawai'i … it's taking the visitor dollar and giving it to the farms, right? Not only for value added, but the visitor dollar is huge in Hawai'i. It's almost $2 billion a year spent on this island [Kaua'i]. So if we want to revitalize agriculture, it's finding an easy way to connect people, which they love and the farmers love" (Maker 2). Additionally, agritourism creates a direct connection and possible feedback loop between chocolate makers and chocolate eaters, which certainly enhances quality. We turn to quality considerations below.

Quality considerations

> Making chocolate is easy. Making good chocolate is extremely difficult.
> — Michael Laiskonis (Giller 2017: vi, original emphasis)

Given a number of factors uniquely present in Hawai'i — ready access to capital and chocolate-making equipment, high-quality transportation infrastructure, access to a land-grant university with a cacao program, close proximity between growing and making, and considerable consumer demand — and its reputation for specialty cacao (Ernst 2017), I was expecting to have some of the best chocolate I've ever eaten. And, indeed, I did eat what I consider to be some of the world's best chocolate, on par with what chocolate connoisseurs like George Bernadini (2015) consider to be the best.[8]

What I was surprised by was that I also ate bad chocolate, the worst chocolate I've ever eaten. My use of the concept of "bad chocolate" is not chocolate snobbery per se, in that chocolate snobbery might equate making Hershey's-style chocolate to bad chocolate, which is not what I intend here. Rather, what bad chocolate means here is that it deviates strongly from the unwritten norms of the US craft chocolate industry discussed above, and presented inedible qualities to the majority of the panel and myself. In other words, it is chocolate dominated by off flavors, such as vomit, found disgusting to the vast majority of people.[9]

This section explores, then explains, this very wide range of quality for farm-to-bar and bean-to-bar chocolate from Kaua'i and the Big Island. The results of the panel analysis, presented in Table 3, corroborated most of my personal impressions of the best and worst bars. Using the Composite Score category (made from four categories, each with a low of 1 to a high of 5), the average for the 17 bars tasted was 2.63, while the standard deviation was 0.57. The high was 3.44 (between the categories of "Good" and "Very good" on the rubric) and the low was 1.36 (in the "Seriously flawed" category). In presenting the data, I reveal only the identities of the makers of bars that were considered above average by the panel, with the intent being that I do not wish to harm the businesses of the makers of the worst bars, as many are still trying to improve their products.

Some farm-to-bar and bean-to-bar producers on Kaua'i and Hawai'i are doing an outstanding job making chocolate. My personal impressions as a craft chocolate aficionado were the following. On Kaua'i, Steelgrass Farm makes only exceptionally good single-estate chocolate. It is top notch within the world of craft chocolate. Another favorite of mine was Garden Island Chocolate. Their best chocolates — made from rare cacao beans from isolated groves on specific farms — came at the end of the chocolate tour, and were truly exceptional, but are not available as bars to consume for the general public.[10] On the Big Island, my favorite bean-to-bar tasting was on Kahi Ola Mau Farm on the northeast portion of the Big Island. They are making excellent chocolate even as they are getting started, although it is not available yet for general consumption as of the research visit in

September 2017. Kuaiwi Farm south of Kona makes flavorful single-estate chocolate that is very good.

Using the Composite Index from the panel analysis data (Table 3), Steelgrass Farm's 70% Dark with Sea Salt bar was the top-rated bar at 3.44. Kahi Ola Mau Farm's 70% Cacao Chocolate Bar was ranked second, at 3.29. Moloa'a Bay's 70% Smooth Dark was the next-highest rated, at 3.14. Sweet Dreams Hawaii Lava Rock Chocolates and the Original Hawaiian Chocolate Factories Dark Chocolate tied for fourth, at 3.05. I considered all but one of these to be excellent chocolate according to the norms of craft chocolate.[11]

The three bars that I found to have the most offensive off flavors were also the most poorly rated by the panel. Two of the three lowest bars were from farmers who had not yet fully commercialized their bars, with Composite Index ratings of 1.96 and 1.74 and open-ended comments such as "puke aftertaste" and "very alkaline, bitter, alcohol, acetone." These farm-to-bar makers had been tinkering with their process for a few harvests, and were giving away samples to friends and acquaintances rather than selling it. The one with the lowest score, at 1.36, is common in stores on Kaua'i. It received low panel scores — seven "seriously flawed" and two "flawed" — with remarkable qualitative comments, such as "Unacceptable. Like a raw, unfermented bean. Gives me a headache," "dog poop, sandy, sour, dirt," and "terrible finish that won't leave my mouth."[12] The question of how this and other sub-par bars can be commercialized is one I consider below.

"Poisoning the well:" Bad bars and the proximate reasons for them

> A lot of things have to go right to make good chocolate. A single misstep at any stage — poor fermentation, drying, roasting, or grinding — can ruin everything.
>
> — Rowan Jacobsen (2010: 253)

Some makers I interviewed spoke to the strong off-flavor qualities in other local makers' chocolate. In one vivid recounting, a farm-to-bar maker noted,

> *Maker 11:* I've had so many bad experiences with [eating locally-made chocolate] that I'm like, "I don't even want to open my mouth for that, I just don't want to," which is why it really scares me because I'm sure that I'm not alone. The last time I ate that, I was aiming over the toilet [she later used the term "urping"], and I don't want to do that again … I was shocked, actually, because some of these guys are actually selling. Their [bar] was all nicely labeled and, "You can get it at this store and that store," and I was like, "God, that's too bad." … They probably started with a good product from the pod, we hope, but past that, they went downhill. I don't think they fermented properly, because that's where that putrid taste gets into the beans and there's just no way to get it out. No matter how much you roast it, it's just not going to go away… . You know like in Harry Potter, they had those jelly beans.
> *RG:* Bertie Bott's.
> *Maker 11:* Yeah, earwax and stuff. These are like evil Hawai'i cacao jelly bean things. It's just like, "No, I don't want to do that, thanks." But [the bad experience] sticks. It really sticks.

A few were critical of a local maker who boasts making and selling "the best chocolate in the world" at farmers' markets but who produces bad chocolate in their assessment.

Some insights from Dan O'Dougherty — trained in cacao growing and fermentation at the University of Hawai'i, Mānoa and now a leading world expert on specialty cacao fermentation who makes his livelihood traveling around to help farmers with fermentation — are useful here. In his talk on fermentation for quality cacao to the Chocolate Makers' UnConference in Seattle in November 2017, he briefly noted that for a long time he tried to get some Hawaiian chocolate makers to stop "poisoning the well" of public perception of Hawaiian chocolate, but eventually gave up. He half-jokingly conjectured that some makers must think that healthy food must taste awful, so that awful-tasting chocolate must be very healthy (O'Dougherty 2017).

As Maker 11 noted above, the source of the off flavors is likely poor fermentation, since fermentation is challenging in small volumes. O'Dougherty (2017) argues that in his experience, it is impossible to produce consistency in cacao bean quality while fermenting with small volumes. This is perhaps the largest challenge of farm-to-bar production on the islands, since smaller single-estate makers often do not produce a high enough volume to yield a consistent fermentation. Addressing this issue, researchers at the University of Hawai'i, Mānoa produced a short manual in 2009 on how to small-scale growers or hobbyists can produce chocolate with as few as six pods; this requires a small controlled climate (like an insulated container), adding an inoculum of yeast, using a controlled heat source to keep the beans at 95°F for three days, and raising them to 113°F for days four through six (Bittenbender and Kling 2009).

I witnessed a much less-controlled version of this process on many farms. Many farmers used ice chests and unpowered deep freezers and refrigerators as fermentation containers in an effort to increase temperatures by containing the heat. Some had an added heat source, but most were not monitoring the temperatures. In at least two operations where temperatures were being monitored, I witnessed that the beans were not reaching the temperatures needed to transform them, even according to the guide for small growers and hobbyists (Bittenbender and Kling 2009). All of this suggests that fermentation on many farms is not adequately transforming the beans to yield quality chocolate (see also Chapter 3 by Overton on "landscapes of failure" for a landscape-level focus about why certain wine regions fail).[13]

Yet the chocolate-making process might also be responsible for some of the off flavors. An important task of a chocolate maker is to sort the beans. The best craft chocolate makers meticulously sort through beans since there are always poor-quality beans given the variability of the fermentation process (even the best batches meeting the highest grades of 95% well-fermented beans need to be sorted). Many makers of bad bars are likely not adequately sorting. Additionally, conching for long periods of time (24 to 76 hours) has long been used as a way to mellow chocolate by volatilizing the acetic acid and other off flavors (Jacobsen 2010). Although in my interviews I did not ask about conching time, it could be that conching for longer would allow for more off flavors to volatilize.

Pinpointing the source of the off-flavor problem is impossible with the phenomenological approach I took to tasting; a more controlled approach is needed at the level of individual makers. For example, I had three bars from three different makers made from the cacao beans of one of the biggest fermentaries on the Big Island. Of the three bars from these beans, one was excellent (with a symphony of blackberries, walnuts, and fudge), one mediocre, and one had a vomit flavor. The panel only tasted the first two of these bars, and the data also show that one was well above average (3.29) and the other was below average (2.22). While this hints that the chocolate-making process is the source of the problems, the bars were not necessarily sourced from the same batch of beans, so

the fermentation could have been off for the worst bar. Thus, separating out the causes would require more research under more controlled conditions.

Another instance of the difficulty of pinpointing the sources of low quality comes from one instance of tasting bars from the same maker over time. I found one maker's bars in a small store that were about six months old (not uncommon with chocolate, as its shelf-life is generally one to two years) and found it to have some off flavors. I later visited them and tasted their most-recently-made chocolate, which was excellent, and therefore a large improvement. During the interview I learned they had recently installed new making equipment together with climate control in their factory, and also had a dedicated, knowledgeable, and detail-oriented employee take over chocolate production. Since the change involved equipment, climate control, and the employee overseeing the making, it is impossible to know the contribution of each to the improved quality, but I suspect the detail-oriented employee makes the largest difference. It suggests that more attention to detail can improve quality for individual makers.

Connections with and disconnections from the mainland chocolate movement

In addition to the specific ways that production impacts quality — the production of off flavors through poor fermentation and/or the lack of removing them through poor manufacturing processes — my research unearthed a deeper reason for poor chocolate quality: unfamiliarity with mainland craft chocolate quality norms.

The main difference in the interviews of makers making excellent chocolate and those making bad chocolate was in their connections to the mainland craft chocolate movement, or to the two internationally-known Hawaiian chocolate makers, Mānoa and Madre. With one exception, those makers with strong connections — knowing well-known makers and/or regularly eating other craft chocolate — made excellent to very good chocolate. Interviewees also talked about the importance of these relationships. For example, staff from one of the craft chocolate leaders, Dandelion Chocolate in San Francisco, California, visited many makers in Hawai'i, and some makers noted that they have kept in touch and follow what they do.

One interviewee who is just starting out and makes excellent chocolate (one of the top rated by the panel and myself) shows the importance of these connections to the wider craft chocolate movement. He noted that "we buy chocolates, whenever we can, we taste them" (Maker 9) in order to expand his palate. He is using roasting profiles from John Nanci — who some call the grandfather of the craft chocolate movement — available online via the well-known website Chocolate Alchemy (Nanci 2017). He is also very detail oriented, and keeps a log of his work as a scientist does chemistry experiments. Thus, it is clear that building external references to quality, and training one's palate in this way, is an important foundation for excellent Hawaiian chocolate, and works well when paired with an experimental approach.

Two other routes to producing excellent chocolate were suggested by individual cases. In one case, a single-estate farm-to-bar operation contracts with one of the Oahu-based makers to make their bars. This relationship allows the chocolate-making company — which has considerable experience with quality cacao beans from around the world — to provide feedback on the beans and the fermentation process. This sharing of expertise across the division of labor between maker and grower across the value chain means that each can specialize in their area of expertise, and, when this works synergistically with considerable feedback between the two, the outcome is excellent.

Another route to excellence is deep experience with growing, fermenting, and making. One maker of excellent chocolate is composed of a wife-and-husband team who are deeply immersed in the place-based nature of cacao growing and fermentation in their region. The partners are constantly experimenting, and know a great deal about different cacao varieties, where various varieties grow and by whom, and how these specific varieties work with their chocolate-making process. In addition to growing their own cacao, they have deep relationships with many householders and have encouraged them to grow different varieties. They take fermentation very seriously, keeping a logbook of every fermentation they do, including the source of the beans down to the field level, and experimenting with wine yeast inoculum, which they have used to good effect. One partner noted:

> at the start of every season we order about a dozen different types of wine yeast from different brew stores. And you know, the little packets? Red Star, Levine, different wine yeasts. And I experiment with the different yeasts and bacteria on the beans when they're fermenting. So we use banana leaves and then different strains of yeast. And I found over the years what strain of yeast works well on what variety [of cacao]. And then what type of fermentation box. So you've gotta control the temperature, humidity, and the oxygen. And it's all about the ferment. You mess up with the ferment, it's hard to recover from that chocolate, it could be full of off-flavors. And people may not even notice the off-flavors … (Maker 1).

Thus, even though they are not deeply connected with the mainland craft chocolate movement, their experience in place and constant experimentation have yielded great results.

A couple of makers who made good, but not outstanding, chocolate were disconnected from the craft chocolate movement. One, a chef who decided to make his own chocolate for his restaurant, makes good chocolate despite a lack of connection to the craft chocolate movement. His trained palate has allowed him to create good chocolate while being solidly within the foodie world of chefs. Similarly, when I asked one farm-to-bar maker her favorite chocolate, she named Lindt. She made moderately good chocolate, but a standard of Lindt means that she was missing out on many of the recent developments in the craft chocolate movement, especially for the most complex bars.

On the other hand, most of the makers of bad chocolate had weak or no connections to the craft chocolate movement, either on the mainland or the two well-known Hawaiian makers. They do not actively try to expand or hone their palates through tasting other craft chocolate, and the results are off flavors that would be completely unacceptable to mainland craft chocolate makers. But the explanation for how they can continue to sell vomit-flavored chocolate lies in the constant flow of new tourists. A consumer base with rapid turnover means that some chocolate makers do not need loyal consumers, which helps explain why there is little incentive for makers of bad bars to improve quality. For example, one maker (of what I would later taste as a a low-quality bar) noted, "that's like 99% of sales, is brand new customers" (Maker 10), even though he did not want it to be that way. He also noted that there is always enough demand for his bars and everyone else's: "everyone sells out. Anyone who's making chocolate in Hawai'i … it's all sold."

Conclusion

Exciting developments are happening in Hawaiian cacao and chocolate. These include chocolate agritourism and a growing farm-to-bar and bean-to-bar movement. My concern for the industry is that very uneven quality will restrict its success. For this reason, the politics of quality is an

important point to end on. Leissle (2018: 159) noted that "One way to understand the politics of quality is to consider that its governance — how quality is measured, valued, and enforced, and by whom — is not a bottom up endeavor." While true for the vast majority of places growing cacao — where quality standards created somewhere off of the farm dictate practices to some extent, as in many other South-North commodity chains (Galt 2014) — the governance of cacao and chocolate quality in Hawai'i *is* largely a bottom-up endeavor. Farm-to-bar makers control the whole value chain, and small bean-to-bar makers do not have the economic leverage to dictate quality standards for the local growers of the cacao beans they purchase. As such, the Hawaiian context is very unique, and offers interesting possibilities in the governance of quality.

At the level of individual makers, experimentation — which abounds in the Hawaiian chocolate world — is essential *but*, in order for many makers to come near the norms of craft chocolate, innovation must be paired with a trained and constantly-expanding palate informed by what is occurring in the U.S. and international craft chocolate movements. All locally-made Hawaiian chocolate retails at about the same price. Currently, for the bad and mediocre bars, the only source of value that can justify the expense (in the mind of discerning consumers) is novelty. This novelty will not convert into customer loyalty if the novel experience is negative, and a negative experience by a consumer based on one bar of local chocolate can taint the image of the whole industry for that consumer and whomever they tell.

As a value proposition, then, Hawaiian chocolate needs to provide consistent quality — across all makers — to continue to attract all people that try it, and to build a returning consumer base. Many individual makers provide consistently high quality, but with one-fifth of bars from small farm-to-bar and bean-to-bar makers having off flavors, the consumer has a highly-variable, hit-or-miss experience with Hawaiian chocolate: some will only taste great chocolate and others will only taste bad chocolate, and the more keen to taste chocolate will likely taste both. This means a large proportion of chocolate consumers will come away from their chocolate-eating experience with only a negative impression — or, at best, a decidedly mixed one. This variation will make it impossible for Hawaiian chocolate to create a unified image of good quality.

Changes at the collective level are essential in this effort. Chocolate makers can consider using their professional organizations to enhance quality for all makers. Indeed, many chocolate makers on the same island are isolated from one another, while a cluster mentality focused on a collaborative economy — recognizing shared interests and acting strategically to advance them — could serve everyone well as it has in wine regions (see Chapter 2 by Myles et al. on successes, and Chapter 3 by Overton on failures). For example, in analyzing Napa Valley's success, Hira and Swartz (2014: 51) conclude, "terroir is just a starting point for understanding how quality is created in wine; the rest depends upon human agency, particularly the efforts of entrepreneurs, to work together to develop the technological breakthroughs that give them a comparative advantage. Behind these breakthroughs and the development of a regional brand are social capital and institutions." At the least, a starting place could be creating a collectively-agreed upon standard for off flavors — and then finding a way to implement it. While associations cannot force makers to enhance quality, there might be ways to work together to identify the sources of the off flavors (and poor temper) and thereby rectify them. Indeed, a new method of mictobatch fermentation was recently published, and might provide a solution to the off flavors produced in fermentation (Bittenbender et al. 2017). Additionally, chocolate makers need a more widespread understanding of the other quality norms of the mainland and international craft chocolate movement, since this is the context in which discerning customers are increasingly immersed.

Lastly, greater synergies could be created between chocolate makers in Hawai'i and in other locations. Some mainland makers bring loyal customers along on their sourcing trips and other excursions to producing regions. This gives their eager customers an opportunity to see cacao growing and understand some of its production process and challenges, likely further enhancing their engagement in craft chocolate. Mainland bean-to-bar makers could highlight tours in Hawai'i as one of the few cacao trips that does not require a passport. Yet, in doing so, they would want to be sure that their consumers would experience high-quality chocolate, which is another reason to address collective quality control. Lastly, the nonprofit Multinational Exchange for Sustainable Agriculture (MESA) has brought Ecuadorian coffee farmer to Hawai'i for knowledge exchange, and a similar type of exchange could be established between Hawaiian cacao farmers and Latin American cacao farmers as a way of learning from one another. Many Latin American countries have long histories of growing and fermenting cacao, and making chocolate. Overall, the potential for farm-to-bar and bean-to-bar craft chocolate to link fermented landscapes of cacao to localized livelihoods in Hawai'i is quite large; my hope is that through strategies discussed above, more benefits can be realized.

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1 I use "the Big Island" to refer to Hawai'i Island throughout this chapter, and use Hawai'i for the entire state.

2 "Bean-to-bar chocolate maker" has become a common term in recent years to refer to chocolate makers who buy dried cacao beans as their raw material for making chocolate (Williams and Eber 2012, Giller 2017). This differs from chocolatiers and confectioners that buy pre-made chocolate (commonly called couverture, in block or disc form) and melt it to create their chocolate products. Here I use "farm-to-bar chocolate maker" to refer to a subset of bean-to-bar makers who also grow their own cacao.

3 This pattern mostly remains today, but some changes are occurring as chocolate-making is growing in countries of origin (Leissle 2018).

4 There are on-going efforts to create formal standards and have them become adopted. Indeed, efforts are underway by the Fine Chocolate and Cacao Institute led by Carla Martin (pers. comm. 20 January 2018) to spread a standard way of evaluating dried specialty cacao beans within a variety of cacao-producing and chocolate-making countries. Additionally, some makers like TCHO have set up their own standards with using collaborative software like Cropster (used initially in quality coffee) to calibrate palates of makers and growers across large distances.

5 As an example of this is TCHO's original chocolate flavor wheel. TCHO is one of the larger craft chocolate makers with national distribution, and is well-respected within the industry, even if looked upon by some as being too large to be craft. TCHO's original flavor wheel describing its six dark chocolates included the flavors "floral" and "earthy." While the other bars — "chocolatey," "nutty," "bright" (citrusy), and "fruity" — have been relatively easy to find since 2014, I had never seen either "floral" or "earthy." I asked Laura Sweitzer, TCHOSource Program Manager, about this, and she said that those two were the least popular so they no longer produced them (pers. comm. 28 March 2016). Additionally, these flavor preferences vary culturally, such that in Japan, with its own growing craft bean-to-bar movement, earthy and umami flavors are more normal, as evidenced when comparing Dandelion Chocolate's bars made in San Francisco for the US consumer and in Tokyo for the Japanese consumer.

6 There are many other norms in the craft chocolate industry that are not related to flavor and chocolate products themselves. This includes an openness to sharing information, and attempts at transparency in sourcing, since industrial chocolate is notoriously opaque about sourcing, the prices

paid to farmers, and the labor conditions on farms due to exposés about child slavery in Côte d'Ivoire and Ghana, which produce half of the world's cacao beans (Off 2008, Bertrand 2011).

7 The tours were so similar, in fact, that one farm felt compelled to make note in its brochure that it is the original. Both were well attended.

8 Bernadini (2015) rigorously tasted all of the bars of chocolate from all of the world's makers that he could find, and detailed all of their flavor profiles. He came up with his top 15 lists of the world's best, including a list of dark chocolate bars. Having personally eaten 6 of these bars, I tend to agree that they are all top notch.

9 As noted in Chapter 1, disgust is a common, and likely protective, human reaction to the process of decay; that some of the less-than-savory flavors of the decay process make it into, or even dominate, some chocolate is perhaps not surprising, even though it is uncommon among professional craft chocolate makers on the mainland. Other than vomit off flavor for about a fifth of the bars, some makers' bars were sub-par due to temper. The lack of a snap suggests that tempering processes have not been perfected by a number of makers, likely due to the challenge of lack of cool temperatures described above, and, potentially, lack of tempering experience.

10 Their mainstream bars found in grocery stores are mediocre from a flavor perspective. They add Ecuadorian cacao beans to the fine-quality-Kauaʻi-grown beans they harvest, which, to me, overpowers the local chocolate flavor, making the bars unremarkable. The panel also found this, with their store-bought bar falling squarely within the middle of the quality range.

11 The divergence is with Sweet Dreams Hawaii Lava Rock Chocolates, which to me has mild off flavors of vomit; this was not detected by the panel. Interestingly, one interviewee talked about this exact problem for this maker, noting that "[the maker] says he has a hard time getting a consistent product and a lot of his customers say it tastes like vomit, he was saying. It wildly varies" (Maker 7).

12 I found two other bars to have predominant off flavors, but these were not found by a majority of the panel tasters, so I do not mention them here.

13 A friend in the chocolate world told me the story of a chocolate-making friend that ordered a batch of cacao beans from one of the larger fermentaries on the Big Island. The beans looked poorly fermented, to the extent that they were afraid of molds that likely developed in them, and did produce low-quality chocolate.

Table 1: Good Food Awards chocolate judging rubric

	5 Excellent. Would recommend highly.	4 Very good. Would recommend.	3 Good. Adequate but unexceptional.	2 Flawed. Would not recommend.	1 Seriously flawed. Would discourage.
Aroma 15%	Enticing, even irresistible. Compels tasting. Complex but balanced (not overpowering). Smells are natural, not artificial.	Convincing aroma. Clear and attractive. Somewhat complex.	Not unpleasant but lacking in complexity. May be weaker or stronger than it should be. Neither compels tasting nor discourages tasting.	May not have a distinguishable aroma. May have a somewhat challenging aroma.	Bad odor. Disagreeable. May be alarming. Reveals defects.
Flavor 45%	Takes the taster through a wonderful arc or progression of flavors. Exhibits subtlety, delicacy, and sophistication. Displays balance of flavor components. Lingering, desirable finish. Compels contemplation.	Fairly sophisticated arc or progression of flavors. Some flavors may be out of balance, but the experience of tasting remains very enjoyable and interesting.	May be flat, monotone, or otherwise unremarkable. Flavors may be out of balance, but the experience of tasting remains acceptable.	Unpleasant qualities outweigh pleasant qualities. May have a variety of flavor notes, but some are unbalanced, unpleasant, or unremarkable. Intensity may be too high or too low.	Bad flavor, undesirable in chocolate. Disconcerting. Reveals clear defects. Leaves unpleasant aftertaste.
Mouthfeel 20%	Enticing, even irresistible. Compels contemplation. Perfect complement to the flavor. Exemplary melt.	Complements the flavor well. Melts nicely. Adds to the enjoyment of tasting.	Neither enhances or detracts from the overall experience. Not much special to recommend it.	May be challenging or unpleasant. May be sticky, muddy, chalky, or waxy.	Bad mouthfeel, undesirable in chocolate. Reveals serious defects. Leaves disagreeable feeling.
Overall Impression 20%	Masterful. Reveals exquisite craftsmanship. Unequivocally deserving of an award.	Very strong example of fine chocolate but not exceptional.	Acceptable but not very good.	Limited appeal. Needs improvement. Negative elements outweigh the positive.	Unacceptable.

Source: 2017 Good Food Awards.

Table 2: Data collection procedures

	Interviews	Farm visits	Factory, workshop, & kitchen visits	Personal Tastings (author)	Panel tasting (taster n=9)
Farm-to-bar makers	13	12	3	13	12 (15 bars)
Bean-to-bar makers	4	—	1	2	2 (2 bars)
Total	17	12	4	15	14 (17 bars)

Table 3: Panel tasting results for 17 bars from Kaua'i and the Big Island (taster n=9)

Island	Sample #	Maker	Bar name	Aroma (1-5*) 15% Mean	Flavor (1-5*) 45% Mean	Mouthfeel (1-5*) 20% Mean	Overall Impression (1-5*) 20% Mean	Overall Impression (1-5*) 20% St Dev	Overall Impression (1-5*) 20% Rank	Composite Score Mean	Composite Score Rank
Big Island (Hawai'i)	H1	Kuaiwi Farm	(dark chocolate, no label)	2.94	2.83	2.67	2.78	0.67	7	2.81	8
	H2	Original Hawaiian Chocolate Factory	Dark Chocolate	3.22	3.11	2.78	3.06	0.81	5	3.05	4
	H3	—	—	2.93	2.14	2.86	2.43	0.79	10	2.46	10
	H4	—	—	2.11	1.89	2.56	2.22	0.97	13	2.12	13
	H5	Sweet Dreams Hawaii	Lava Rock Chocolates (dark)	3.33	2.83	3.22	3.17	1.06	3	3.05	4
	H6	Kahi Ola Mau Farm	70% Cacao Chocolate	3.11	3.50	3.11	3.11	1.17	4	3.29	2
	H7	—	—	1.88	1.44	2.50	1.56	0.62	15	1.74	15
	H8	—	—	2.13	2.31	2.75	2.31	1.10	12	2.37	12
	H9	Red Water Café	Dark	2.50	3.00	2.75	3.06	0.94	5	2.89	6
Kaua'I	K1	—	—	1.22	1.22	1.89	1.22	0.44	16	1.36	16
	K2	Steelgrass Farm	70% Dark	2.44	3.00	2.44	2.56	1.13	9	2.72	9
	K3	Steelgrass Farm	70% Dark with Sea Salt	3.83	3.39	3.28	3.44	1.24	1	3.44	1
	K4	Moloa'a Bay	60% Desert Chocolate	2.44	3.22	2.61	3.28	1.03	2	2.99	5
	K5	Moloa'a Bay	70% Smooth Dark	3.25	3.25	3.00	2.94	1.27	6	3.14	3
	K6	Garden Island Chocolate	Dark Chocolate	3.17	2.72	3.13	2.67	0.71	8	2.86	7
	K7	—	—	2.33	2.44	2.56	2.33	0.50	11	2.43	11
	K8	—	—	2.11	1.78	2.50	1.72	1.25	14	1.96	14
* See Table 1 for tasting rubric used.			Average	2.64	2.59	2.74	2.58	0.92		2.63	
Source: panel tasting.			Standard Deviation (St Dev)	0.66	0.69	0.35	0.63	0.27		0.57	

Legend for Fill Categories		
Good to Very Good (≥ Average +1 St Dev)	3.21 to 3.44	3.20 to 3.44
Good (Average to +1 St Dev)	2.58 to 3.20	2.63 to 3.19
Flawed (-1 St Dev to Average)	1.95 to 2.57	2.05 to 2.62
Seriously Flawed (≤ Average -1 St Dev)	1.22 to 1.94	1.36 to 2.04


Healthy Hut Market & Cafe
$10.79
Healthy Hut Market & Cafe
$14.69
Healthy Hut Market & Cafe
$7.09
Grown & Hand Made on Kaua'i
70% Kaua'i CACAO
LIMITED EDITION DARK CHOCOLATE
Hawaiian Chocolate
Macadamia Nut & Coconut
85%
Garden Island Chocolate
Hawaiian Chocolate
Alaea Sea Salt
stone ground chocolate
85%
Garden Island Chocolate
$3.49
$6.19
$7.29
$5.79
$7.29
$12.29
$12.29
$12.29
HANALEI ORGANIC
HANALEI ORGANIC
HANALEI ORGANIC


AMEDEI
TOSCANO BLACK
70
AMANO
ARTISAN CHOCOLATE
Dos Rios
DOMINICAN REPUBLIC
RASPBERRY ROSE
MAIKAI SPECIAL
8.99
12.99
CACAO SAMPAKA
Dick Taylor
BLACK FIG
Ginger
BLACK SALT
MO'S DARK
MAROU
FAISEURS DE CHOCOLAT
AKESSON'S
WILD OPHELIA
BEEF JERKY & SMOKED SALT
PEANUT BUTTER & BANANA
DARK PERFECTION 70
INTO DARK 80
POPPED QUINOA 70
STRAWBERRY MERMAID 67
Cocoa Parlor
SCHARFFEN BERGER
LICORICE
RJS
SAMPELLEGRINO


100% HAWAIIAN COFFEE. ESPRESSO & CHOCOLATE · SMOOTHIE · BREA
Shark Stop
Hawaiian
Chocolate
Ice Cream Coffee
OPEN